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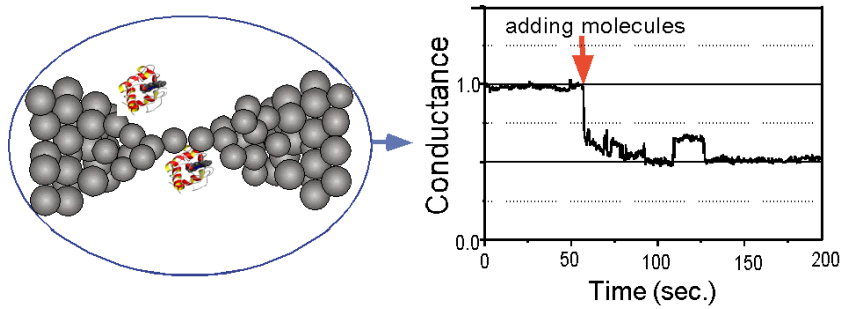
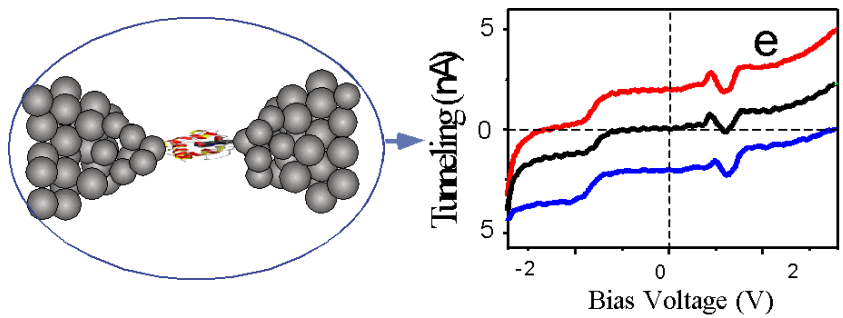
An electrochemical method has been developed to fabricate atomically thin metal wires with quantized conductance. The conductance of the wires is sensitive to the interactions of molecules with the wire, which allows one to study and to detect a few molecules. The method has been extended to fabricate nanoelectrodes that can electrically connect molecules to the external world, which is a critical step towards functional devices based on individual molecules.



Adsorption of dopamine onto Cu wire.



Electron flow through phenanthroline.